On some Combinations of Platinum. *By* Edmund Davy, *Esq. Professor of Chemistry, and Secretary to the Cork Institution. Communicated by* F. Babington, *M.D. F.R.S.* Read February 17, 1820. [*Phil. Trans.* 1820, *p.* 108.]

The principal object of this paper is to describe a peculiar compound of platinum, obtained from the sulphate by the agency of alcohol. On boiling sulphate of platinum with alcohol, a substance is precipitated, which, when dried, is black, insoluble in water, and unalterable by exposure to air. It is reduced with a slight explosion when heated. It acquires fulminating properties when steeped in ammonia. It is insoluble in nitric, sulphuric, and phosphoric acids, and slowly soluble in muriatic acid. By alcohol it is immediately decomposed, as shown by slightly moistening it with that liquid; and such heat is produced as to ignite the separated platina. During these changes acetic acid is formed.

Mr. Davy gives a detailed analysis of this powder, whence it appears to consist almost solely of platinum, with a little oxygen, and the elements of nitrous acid; a small portion of carbon was also obtained, which, however, the author regards as accidental; the presence of nitrous acid is referred to the manner in which the sulphate of platinum is formed, namely, by the agency of nitrous acid on sulphuret of platinum.

In the fifth and sixth sections of this paper, Mr. Davy describes the action of sulphate of platinum upon solutions of jelly, in which it forms a precipitate composed, when dried at 212°, of

56·11 oxide of platinum,
20·02 sulphuric acid,
23·87 gelatine and water.

The author considers the sulphate of platinum as the most delicate known test for jelly.

In the seventh section of his paper, Mr. Davy describes a grey oxide of platinum, obtained by the action of nitrous acid on fulminating platinum, and affording on analysis,

100 platinum + 11·9 oxygen.

Assuming, with Vauquelin and Berzelius, that the black oxide of platinum contains 15 per cent. of oxygen, the author observes that the grey oxide which he has described may be considered as the protoxide, and will consist of one proportion of platinum and one of oxygen, or 126 platinum + 15 oxygen, and the black oxide will consist of 126 platinum and 22·5 oxygen, or of one proportion of metal and $1\frac{1}{2}$ of oxygen.

On the Methods of Cutting Rock Crystal for Micrometers. *By* William Hyde Wollaston, *M.D. F.R.S.* Read February 24, 1820. [*Phil. Trans.* 1820, *p.* 126.]

For the purpose of examining the phenomenon of double refraction, it is easy to combine a wedge of rock crystal with one of crown

glass, so that a luminous object seen through them shall appear in its true place by ordinary refraction, accompanied by a second image produced by extraordinary refraction.

In consequence of the dispersion of colours which occurs in employing different substances, such a combination is not suited for the micrometer invented by Abbé Rochon; but it is not difficult to obtain such a section of rock-crystal as may be substituted for the glass wedge, so that the pencil of light shall be colourless without diminishing the separation of the images. But since the degree to which the double refraction of rock crystal separates the two portions of a beam of light transmitted through it, is sometimes not sufficiently great, it becomes desirable to increase it; and though the means of effecting this have not been described, the author proceeds to explain the method that he has found advantageous, and which he regards the same as that of M. Rochon.

The author then describes three modes of cutting wedges of rock crystal, the axis of crystallization being differently placed in each. In the first, or horizontal wedge, the axis is at right angles to the first surface. In the second, or lateral wedge, the axis is in the first surface and parallel to its acute edge. In the third, or vertical wedge, the axis is also in the first surface, but at right angles to the acute edge. An object seen through the first wedge, in the direction of the axis, does not appear double; but in the others the transmitted rays pass at right angles to the axis, and they each produce two images.

By placing two of these wedges together, with their acute edges in opposite directions, there are obviously three modes in which they may be combined in pairs, represented by LH, VH, and VL. In the two first cases, the separation of the images will be the same, and an object seen through the combination appears double to the amount of 17′; but the third produces a distinct effect; for, by reason of the transverse position of the axes of crystallization, the separation of the two images becomes exactly doubled. The pencil ordinarily refracted by the first wedge is refracted extraordinarily by the second, and *vice versâ*, so that neither of the divided pencils returns to its true place; and since one falls as much short of the mean as the other exceeds the truth, they are ultimately separated twice the usual distance between the ordinary and extraordinary refractions, and thus the images are separated 34′. This, the author says, it can scarcely be doubted is essentially the construction employed by M. Rochon.—This paper is concluded by some further directions respecting the mode of cutting and arranging the prisms for the above purpose.

On a New Principle of constructing Ships in the Mercantile Navy. By Sir Robert Seppings, *F.R.S.* Read March 9, 1820. [*Phil. Trans.* 1820, *p.* 133.]

In the present mode of constructing the ribs of English merchant ships, only half the timbers are united, so as to constitute any part